AMENDMENTS TO THE CLAIMS

Please cancel Claims 16-48 without prejudice, as indicated below.

Please add new Claims 52-57.

A complete listing of all claims is presented below with insertions underlined (e.g., insertion), and deletions struckthrough or in double brackets (e.g., ~~deletion~~ or [[deletion]]):

1. (Previously Presented) An optical sensor comprising:

a light source having an output that emits a first optical signal;

a first directional coupler comprising at least a first port, a second port and a third port, the first port optically coupled to the light source to receive the first optical signal emitted from the light source, the first port optically coupled to the second port and to the third port such that the first optical signal received by the first port is split into a second optical signal output by the second port and a third optical signal output by the third port;

a hollow-core photonic-bandgap fiber having a hollow core surrounded by a cladding, the hollow-core photonic-bandgap fiber optically coupled to the second port and to the third port to form an optical loop such that the second optical signal and the third optical signal counterpropagate through the hollow-core photonic-bandgap fiber and return to the third port and the second port, respectively, the cladding of the hollow-core photonic-bandgap fiber substantially confining the counterpropagating second optical signal and third optical signal within the hollow core; and

an optical detector located at a position in the optical sensor to receive the counterpropagating second and third optical signals after the second and third optical signals have traversed the hollow-core photonic-bandgap fiber.

2. (Original) The optical sensor of Claim 1, wherein the light source comprises a broadband source outputting light having a spectral distribution with a full width at half maximum of about 1 nanometer or larger.

3. (Original) The optical sensor of Claim 2, wherein the light source comprises a superfluorescent light source.

4. (Original) The optical sensor of Claim 3, wherein the light source mean wavelength is stable to at least about ±100 parts per million.

5. (Original) The optical sensor of Claim 3, wherein the light source mean wavelength is stable to at least about ±10 parts per million.

6. (Original) The optical sensor of Claim 3, wherein the light source mean wavelength is stable to at least about ±1 part per million.

7. (Original) The optical sensor of Claim 3, wherein the light source mean wavelength is stable to at least about ±0.1 part per million.

8. (Original) The optical sensor of Claim 3, wherein the superfluorescent light source comprises a superluminescent fiber source.

9. (Original) The optical sensor of Claim 3, wherein the superfluorescent light source comprises a light-emitting diode.

10. (Original) The optical sensor of Claim 2, wherein the light source comprises a broadband fiber laser.

11. (Original) The optical sensor of Claim 1, wherein the light source comprises a broadband source outputting light having a spectral distribution with a full width at half maximum of between about 1 nanometer and about 10 nanometers.

12. (Original) The optical sensor of Claim 1, further comprising an amplitude modulator that modulates the amplitude of the first optical signal output from the light source.

13. (Original) The optical sensor of Claim 12, wherein the amplitude modulator is external to the light source.

14. (Original) The optical sensor of Claim 1, further comprising a frequency modulator that modulates the frequency of the first optical signal output from the light source.

15. (Previously Presented) The optical sensor of Claim 14, wherein the frequency modulator is external to the light source.

16.-48. (Cancelled)

49. (Previously Presented) The optical sensor of Claim 1, further comprising a second directional coupler optically coupled to the light source and to the first port of the first directional coupler, the second directional coupler comprising at least a first port, a second port, and a third port, wherein:

the first port of the second directional coupler is optically coupled to the light source;

the second port of the second directional coupler is optically coupled to the first port of the first directional coupler; and

the third port of the second directional coupler is optically coupled to a non-reflective termination.

50. (Previously Presented) The optical sensor of Claim 49, wherein a polarizer is optically coupled to the second port of the second directional coupler and to the first port of the first directional coupler.

51. (Previously Presented) The optical sensor of Claim 49, wherein the second directional coupler comprises a fourth port that is optically coupled to a photodetector.

52. (New) The optical sensor of Claim 2, wherein the hollow-core photonic-bandgap fiber comprises polarization-maintaining photonic-bandgap fiber.

53. (New) The optical sensor of Claim 2, wherein the hollow-core photonic-bandgap fiber comprises a plurality of features arranged in a periodic array across a cross-section of the hollow-core photonic-bandgap fiber that surrounds the hollow core.

54. (New) The optical sensor of Claim 2, wherein the hollow-core photonic-bandgap fiber comprises a Bragg fiber.

55. (New) The optical sensor of Claim 2, wherein the hollow-core photonic-bandgap fiber cladding comprises a silica-based glass.

56. (New) The optical sensor of Claim 55, wherein the cladding further comprises a periodic array of channels in the silica-based glass.

57. (New) The optical sensor of Claim 56, wherein the channels are hollow.